

WHAT IS CLAIMED IS:

1. A bandgap voltage reference circuit comprising:
  - a first circuit providing a first voltage substantially proportional to  $V_{be}$  of a first bipolar transistor;
  - 5 a second circuit providing a second voltage  $\Delta V_{be}$  substantially proportional to the difference of two  $V_{be}$  voltages of two bipolar transistors; and
  - a comparator having respective inputs coupled to  $V_{be}$  and  $\Delta V_{be}$  and an output coupled to the base of the first bipolar transistor whereby a voltage substantially proportional to the sum of respective constants multiplying  $V_{be}$  and  $\Delta V_{be}$  is provided at 10 the output of the comparator.
2. A bandgap voltage reference circuit comprising:
  - a first bipolar transistor providing substantially a reference voltage  $V_{be}$ ;
  - a current mirror circuit comprising two bipolar transistors coupled in a current mirror arrangement for providing a voltage difference  $\Delta V_{be}$  comprising substantially a 5 difference signal between the respective  $V_{be}$  voltages of the two bipolar transistors; and
  - a comparator having respective inputs coupled to  $V_{be}$  and  $\Delta V_{be}$  and an output coupled to the base of the first bipolar transistor whereby a voltage substantially proportional to the sum of respective constants multiplying  $V_{be}$  and  $\Delta V_{be}$  is provided at the output of the comparator.
3. A bandgap voltage reference circuit comprising:
  - a first circuit providing a first voltage substantially proportional to  $V_{be}$  of a first bipolar transistor;
  - a second circuit providing a second voltage  $\Delta V_{be}$  substantially proportional to the difference of two  $V_{be}$  voltages of two bipolar transistors; and

a comparator having respective inputs coupled to  $V_{be}$  and  $\Delta V_{be}$  and an output coupled to the base of the first bipolar transistor whereby a substantially temperature independent voltage reference is provided at the output of the comparator.